

A science map of Turkey in the field of ophthalmology from 2014 to 2019

Science map of Turkey in ophthalmology

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Abstract

Aim: In this study, we aimed to analyze and compare the articles from national and international journals (Science Citation Index (SCI) category) published in the field of ophthalmology by Turkish authors. At the same time, considering the institution of the first author of the articles, we aimed to create a map of the ophthalmological science for Turkey.

Material and Methods: For this retrospective, bibliometric analysis, 31 international journals included in the 2018 Science Citation Index and 5 national journals (including SCI) in the field of ophthalmology were analyzed. The articles submitted by Turkish researchers were included. The subspecialties of the journals, the date of publication, the number of authors, the institution where the study was conducted and whether it was an animal study or not, were recorded.

Results: A total of 654 original research articles were published in the 31 SCI journals and 1182 in the 5 national journals in the field of ophthalmology between 01.01.2014 and 01.09.2019. Of the 1182 articles from national ophthalmology journals, 461 (39.0%) were from universities, 421 (35.6%) from training and research hospitals, 77 (6.5%) from private universities, 144 (12.2%) from state hospitals, and 79 (6.7%) from private hospitals/private practices. In the SCI journals, compared to 2016 and earlier, the mean number of authors declined significantly in 2017 and later on ($p < 0.001$). Therefore, the number of authors declining after 2016 was statistically significant (paired t-test 2019-2016: $p < 0.001$, 2018-2016: $p = 0.020$, 2017-2016: $p > 0.05$). In the national journals, the number of authors declining after 2016 was statistically significant (paired t-test 2019-2016: $p < 0.001$, 2018-2016: $p > 0.05$, 2017-2016: $p = 0.004$). Istanbul, Ankara and İzmir account for 48.91% of the articles published in national journals and 55.52% in SCI international journals.

Discussion: Universities and training and research hospitals are at the forefront as the institutions contributing to scientific publications in ophthalmology in Turkey. Medical retina is the area attracting the most attention of authors. Researchers conducting experimental animal studies tend towards international journals as they are multidisciplinary studies of scientific value.

Keywords

Associate professorship; Ophthalmology; Science map; SCI; National index; Turkey

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Introduction

Today, one of the main criteria for scientific productivity of institutions and countries is the published scientific material. In addition to being articles that bring innovation and sound, are highly cited, their number is also important. Preparing, writing and publishing articles are important steps in academic progress [1]. Those who want to become academicians in ophthalmology and want to contribute to science are constantly preparing articles for publication in both national and international ophthalmology journals [2]. The authors plan and write their articles according to the criteria of the journal in which they wish to publish them. When national and international publications are analyzed, it is seen that there are differences in terms of both the subject sub-group and the number of authors [3]. In this study, we aimed to analyze and compare the articles from national and international journals (Science Citation Index (SCI) category) published in the field of ophthalmology by Turkish authors. Although there have been previous studies involving the evaluation of the number of citations and impact factors [4, 5], this is the first study to create a map of ophthalmological science for Turkey considering the institution of the first author of the articles.

Material and Methods

For this retrospective, bibliometric analysis, 31 journals included in the 2018 Science Citation Index and 5 national journals in the field of ophthalmology were analyzed (Table 1). These journals were analyzed by examining the Clarivate Analytics, Web of Science Master Journal List. For the inclusion of national studies for evaluation, the internet sites of 5 Turkish journals in the field of ophthalmology, which have been accredited by ULAKBIM (Turkish Academic Network and Information Center) since 2014 were accessed. Publications from Turkey published between 01.01.2014 and 01.09.2019 in these journals were included in the current study. Only original research articles were included, and any case reports, reviews, book chapters, letters to Editors, clinical images or abstracts were excluded from the study.

The criteria for associate professorship in Turkey changed in December 2016. The criteria for publication of international articles before and after 2016 are shown in Table 2. The years 2014, 2015 and 2016 were categorized as before the change in criteria, and 2017, 2018, and the first 9 months of 2019 were categorized as the period after the change in criteria. The first author is from Turkey and studies published from Turkey were included in the evaluations.

Screening was performed by 2 researchers separately examining the websites of the journals between the defined dates to examine each edition in the archives, and by examining the National Library of Medicine - National Institutes of Health, PubMed using the journal name. For national ophthalmology journals, the archives of the journals' websites and the Dergipark internet address were examined. The data obtained were collated with cross-checks. The journal in which the article was published, the date, the number of authors per article, the author's institution, the subject of the article, and whether it was an animal study or not, were recorded. Subject groups were defined as Glaucoma, Cataract and Refraction Surgery, Contact

Lens, Corneal and ocular surface, Optical refraction and low vision rehabilitation, Strabismus, Medical retina, Uvea, Vitreo-retinal surgery, Ocular oncology and oculoplastic surgery. The authors' institutions were classified as state university, training and research hospital, private university, state hospital, private hospital and private practice centers. Changes in the number of authors were evaluated according to the years. The areas in which animal studies were conducted were mentioned.

Statistical analysis

The results are presented as percentages, mean and the number (%). A paired t-test was used to evaluate differences between mean number of authors and articles according to years. A p-value <0.05 was considered significant. Statistical analyses were performed using the Statistical Package for Social Sciences (SPSS 24.0 for Windows; IBM, Armonk, NY, USA) software. As this was bibliometric analysis, Ethics Committee approval was not required.

Results

A total of 654 original research articles were published in the 31 SCI journals and 1182 in the 5 national journals in the field of ophthalmology between 01.01.2014 and 01.09.2019. In the distribution according to the journal, 119 (18.20%) were published in the journal of Current Eye Research, 71 (10.90%) in the journal of Ocular Immunology and Inflammation and 68 (10.40%) in the journal of Cornea. In the specified study period, no article had been accepted by the Journal of Refractive Surgery, Journal of Ophthalmology and the Journal of Visual Neuroscience. In the distribution according to the national ophthalmology journal, 297 (25.12%) were published in the MN Journal of Ophthalmology, 255 (21.57%) in the Retina-Vitreous Journal, and 250 (21.15%) in the Turkish Journal of Ophthalmology (Table 1).

When the institution of the first author was examined, it was observed that more articles were accepted from universities (Figure 1). Of the 654 articles in the field of ophthalmology, 344 (52.60%) were from state universities, 179 (27.40%) from training and research hospitals, 44 (6.70%) from private universities, 45 (6.90%) from state hospitals and 42 (6.40%) from private hospitals/private practice centers. Of the 1182 articles in national ophthalmology journals, 461 (39.0%) were from universities, 421 (35.6%) from training and research hospitals, 77 (6.5%) from private universities, 144 (12.2%) from state hospitals, and 79 (6.7%) from private hospitals/private practice centers (Figure 1).

When the articles in international journals were categorized according to the subject of the study, most of the articles in the field of ophthalmology have focused on the subject of the medical retina (212/654, 32.4%), followed by corneal and ocular surface (170/654, 26.0%), glaucoma (96/654, 14.7%), uvea-behçet (51/654, 7.8%), vitreo-retinal surgery (37/654, 5.7%), cataract and refraction surgery (28/654, 4.3%), ocular oncology and oculoplastic surgery (19/654, 2.9%), optical refraction and low vision rehabilitation (19/654, 2.9%), strabismus (16/654, 2.4%) and contact lens (6/654, 0.9%). When the articles were classified according to the subject in national ophthalmology journals, most of the articles have focused on the subject of medical retina (451/1182, 38.2%), followed by corneal and

Table 1. Number of articles according to journals and years

Name of the Journal	Number of Ophthalmology articles according to years in Science Citation Index International Journals						Total
	2019	2018	2017	2016	2015	2014	
Acta Ophthalmologica	0	2	1	4	4	3	14
American Journal of Ophthalmology	2	0	2	4	3	4	15
British Journal of Ophthalmology	2	4	2	2	8	4	22
Canadian Journal of Ophthalmology	1	3	2	2	4	4	16
Clinical and Experimental Ophthalmology	0	0	0	1	2	5	8
Cornea	13	9	8	17	11	10	68
Current Eye Research	23	6	26	25	24	15	119
Experimental Eye Research	1	0	0	3	1	0	5
Eye	10	8	16	16	7	10	67
Graefes Archive for Clinical and Experimental Ophthalmology	17	11	4	3	8	10	53
Investigative Ophthalmology & Visual Science	1	2	0	2	1	1	7
JAMA Ophthalmology	0	0	1	0	0	1	2
Japanese Journal of Ophthalmology	0	1	0	0	0	4	5
Journal of Cataract and Refractive Surgery	5	2	3	4	5	5	24
Journal of Glaucoma	6	3	6	25	10	7	57
Journal of Refractive Surgery	0	0	0	0	0	0	0
Klinische Monatsblätter Fur Augenheilkunde	0	0	0	0	0	1	1
Molecular Vision	0	1	0	2	0	2	5
Ocular Immunology and Inflammation	27	14	4	13	10	3	71
Ophthalmic and Physiological Optics	0	0	0	0	0	0	0
Ophthalmic Research	1	1	2	4	3	2	13
Ophthalmic Surgery Lasers & Imaging Retina	0	0	0	0	1	1	2
Der Ophthalmologe	0	0	0	1	0	0	1
Ophthalmologica	3	2	1	5	3	0	14
Ophthalmology	0	0	0	0	0	0	0
Optometry and Vision Science	0	1	1	4	4	2	12
Progress in Retinal and Eye Research	0	0	0	0	0	0	0
Retina-The Journal of Retinal and Vitreous Diseases	8	14	4	7	5	7	45
Survey of Ophthalmology	0	1	1	0	1	2	5
Vision Research	0	0	0	2	1	0	3
Visual Neuroscience	0	0	0	0	0	0	0
Total Number of articles	120	85	84	146	116	103	654
	Number of Ophthalmology articles according to years in National Journals						
	2019	2018	2017	2016	2015	2014	
Turkish Journal of Ophthalmology	36	34	35	35	35	75	250
Journal of Clinical Ophthalmology Turkey	30	28	27	32	30	27	174
Retina-Vitreous Journal	46	43	45	43	41	37	255
Journal of Glaucoma-Cataract	26	19	41	41	42	37	206
MN Journal of Ophthalmology	43	47	56	53	54	44	297
Total Number of articles	181	171	204	204	202	220	1182

Table 2. International publication criteria for associate professorship before and after 2016

2016 April and before	2016 December and after
<p>To have been named as the first author on at least one original research article published in an Science Citation Index-Expanded (SCI-E), Social Sciences Citation Index (SSCI) or Arts & Humanities Citation Index (AHCI) journal related to the scientific area for which associate professorship is applied, and which has not been produced from the specialist or doctorate thesis of the candidate (this does not include sub-branch specialism theses), and to have published at least three original research articles after obtaining doctorate or medical specialist.</p>	<p>1. Full research articles not produced from the doctorate thesis in the scientific area for which associate professorship is applied (not including letters to the Editor, abstract, review, or book review)</p> <p>a) Original research article published in an SSCI, SCI, SCI-Expanded, or AHCI journal (20 points)</p> <p>b) Original research article published in a journal scanned by an international index (other than the indexes stated in 1a) (10 points)</p> <p>c) Case presentation published in a journal as defined in 1a (5 points)</p> <p>With at least 20 points obtained as the leading author in the scope of 1a, at least 40 points must be obtained in this item.</p> <p>2. Citations</p> <p>In journals scanned by SCI, SCI-Expanded, SSCI and AHCI; In each of the publications published in the books published by international publishing houses, where the candidate is not included as a writer, regardless of the number of citations in the text (3 points)</p>

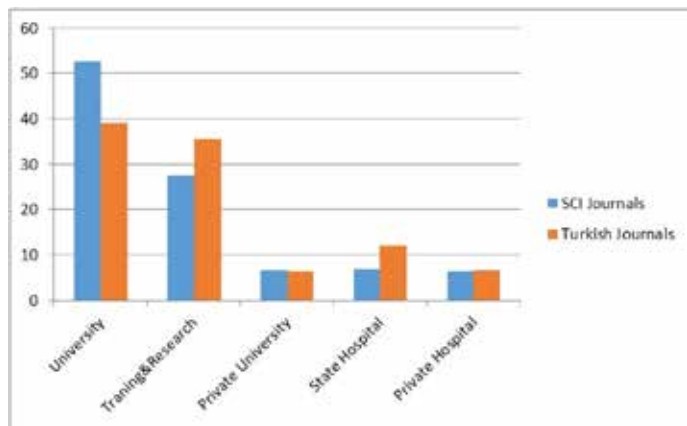


Figure 1. Percentage of Institute of the Leading Author

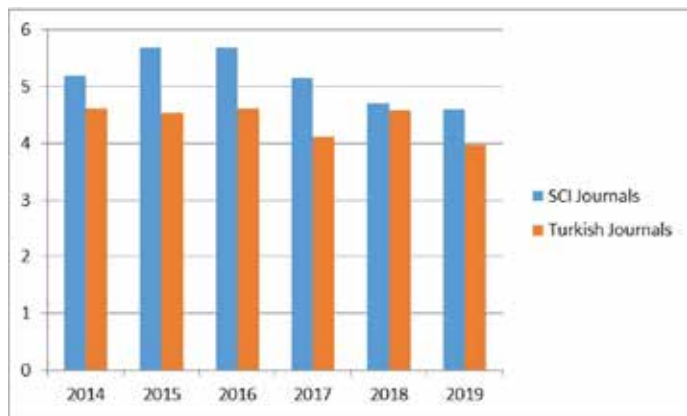


Figure 2. The mean number of authors according to year

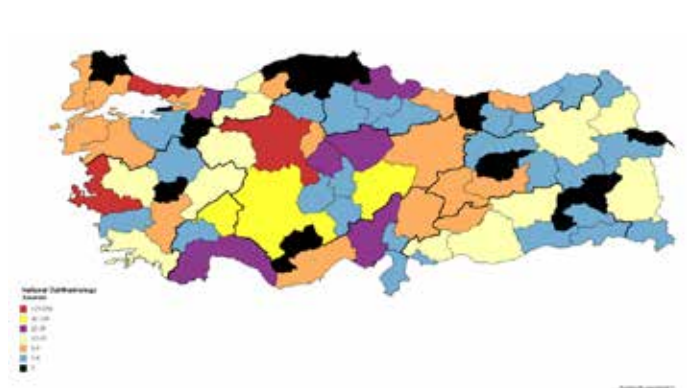


Figure 3. Distribution of ophthalmology publications in national ophthalmology journals from 2014 to 2019

ocular surface (191/1182, 16.2%), glaucoma (173/1182, 14.6%), cataract and refraction surgery (144/1182, 12.2%), ocular oncology and oculoplastic surgery (105/1182, 8.9%), optical refraction and low vision rehabilitation (32/1182, 2.7%), uvea-behçet (30/1182, 2.5%), vitreo-retinal surgery (30/1182, 2.5%), strabismus (19/1182, 1.6%) and contact lens (7/1182, 0.6%).

When the mean number of authors per publication and the year of publication were considered in SCI journals, it was found that there were an average of 5.19 authors in 2014, 5.68 in 2015, 5.68 in 2016, 5.16 in 2017, 4.70 in 2018 and 4.60 in the first 9 months of 2019 (Figure 2). The number reached 5.68 in 2016, and then gradually reduced to 4.60 in 2019. Compared to 2016

and earlier, the number of authors decreased significantly in 2017 and later on ($p < 0.001$). Therefore, the number of authors declining after 2016 was statistically significant (paired t-test 2019-2016: $p < 0.001$, 2018-2016: $p = 0.020$, 2017-2016: $p > 0.05$). When the number of authors was evaluated according to the year of publication in national ophthalmology journals, it was determined that the mean number of authors was 4.61 in 2014, 4.55 in 2015, 4.62 in 2016, 4.12 in 2017, 4.57 in 2018 and 3.97 in the first 9 months of 2019. The decrease in the number of authors after the year 2016 was statistically significant (paired t-test 2019-2016: $p < 0.001$, 2018-2016: $p > 0.05$, 2017-2016: $p = 0.004$).

Of the total 654 articles analyzed 40 (6.1%) were animal studies from the international SCI journals. Between 2014 and 2019, 11 of these experimental animal studies were published in the journal Current Eye Research, constituting 9.24% (11/119) of all the studies published in the journal. The second journal was the Cornea Journal with 13.23% (9/68) of all 68 articles accepted as experimental animal studies. The subjects of the animal studies were corneal and ocular surface in 19 (47.5%) articles, medical retina in 10 (25.0%), the uvea in 5 (12.5%), glaucoma in 4 (10.0%) and optical refraction and low vision rehabilitation in 2 (5.0%). Of the total 1182 articles examined, 4 (0.33%) were animal studies in national ophthalmology journals. Among these, three animal studies were published in the MN Journal of Ophthalmology and one in the journal of Clinical Ophthalmology, Turkey.

When the publications in national Ophthalmology journals were analyzed, it was seen that most of the publications were made in Istanbul (235/1182, 19.90%), followed by Ankara (212/1182, 17.90%) and İzmir (132/1182, 11.20%). The publication weight of these three provinces (Istanbul, Ankara, and İzmir) corresponds to 48.98% (579/1182) of the total publications, followed by the three major cities: Kayseri (38/1182, 3.2%), Isparta (36/1182, 3.1%) and Konya (34/1182, 2.9%). The first author from 13 provinces has never published an article in national journals in Turkey. The colors corresponding to the number of articles are indicated on the labels of the map (Figure 3). The mapchart.net website has been used for map density coloring.

Discussion

To our knowledge, this is the first study analyzing and comparing the number and distribution of the ophthalmology articles from Turkey published in international SCI and national journals. In academic progress, the publication of articles is important with respect to contributing to the presentation of science and for the motivation of the authors [6-8]. At the stage of article preparation, authors plan to submit the article either to international or national journals. If the article is rejected by the international journal, it is submitted to a national journal as the chances of acceptance are thought to be high. With the change in the criteria for associate professorship in Turkey, as lower points are allotted for national journal publication, authors prefer to submit first to international journals (Table 2). It can be seen that international journals are more interested in articles that are more innovative, prospective, with a long follow-up period, or are at the genetic or molecular level [9]. Prepared articles that are retrospective in nature, record

scanning, clinical approaches and small case series, are more frequently submitted to national journals. While still at the conceptual stage, authors sometimes have no idea whether the article is more appropriate for a national or international journal. In international journals, the written language of the article, the quality of statistics, and the evaluation of the contribution to the literature are more thoroughly studied than in national ones [10, 11].

When evaluation was made for the number of authors, a statistically significant decrease in both national and international journals was observed following the change in associate professorship criteria in Turkey in December 2016. From 2014 to date, compared to national journals, a higher number of authors are recorded in articles accepted by international journals, independent of the change in associate professorship criteria. In international publications, the number of authors is increasing as there is a need for more and diverse opinions in ideas, discussions and establishing points of view that will contribute to science. However, the inclusion of more researchers in study will accelerate the data collection process, and a more professional approach is required in respect of the written language and statistics, and a more scientific effort is made with the participation of other branches.

The change in associate professorship criteria strained researchers who wanted to be able to collect more points and conduct studies for an article in a restricted environment. Due to conducting studies with fewer authors, the number of innovations from different ideas has decreased. Thus, researchers prefer directing themselves from long-term follow-up studies to retrospective studies that can achieve quick results. The change in associate professorship criteria can be considered as having made a change in the type of studies conducted subsequently in the future.

Regarding the articles published in the field of ophthalmology, university hospitals and training and research hospitals were seen to be the leading institutions with 39.0% in national journals and 52.60% in SCI journals. State hospitals and private universities and hospitals were seen to contribute more to national publications. Patients with health problems that cannot be resolved in state hospitals and private hospitals are transferred to higher-level centers, which increase the range of cases in university and training and research hospitals. A range of cases helps different ideas to emerge and allows extensive case series to be formed. In addition, the experience, foresight and scientific capability of faculty members supporting the writing and publishing of articles constitute an advantage for authors [12].

When the institutions of the leading authors were examined, it was observed that more articles were accepted from universities (Figure 1). Among 654 articles in the field of ophthalmology, 344 (52.60%) were from universities, 179 (27.40%) from training and research hospitals, 44 (6.70%) from private universities, 45 (6.90%) from state hospitals and 42 (6.40%) from private hospitals/private practices. Among 1182 articles from national ophthalmology journals, 461 (39.0%) were from universities, 421 (35.6%) from training and research hospitals, 77 (6.5%) from private universities, 144 (12.2%) from state hospitals, and 79 (6.7%) from private hospitals/private practices

Turkish universities have not reached the desired level in the subject of publications in the field of medicine, biology and other natural sciences, and according to the Nature Index published in Nature journal, of the total 60,473 articles published in 2018, had a share of only 1.16/1000 with 70 articles published [5]. When ophthalmology is considered specifically, in an evaluation by Schulz et al., Turkey was in 13th place in the classification of the number of articles, and in 16th place in respect of the impact factor of the articles published [5].

So far the subject of the articles is concerned, the field of medical retina was at the forefront [13, 14]. Recently, publications in the area of Medical retina have shown a tendency to genetic, surgical, and pathological studies. Because of this, genetic, surgical, and pathological studies in the area of medical retina can provide opportunities for animal studies. When diseases encountered in daily practice are considered, ophthalmology practice is generally formed of ocular problems, cataract and refractive errors [1, 14, 15]. In the publications from Turkey in the field of ophthalmology, the articles which were most cited were seen to be mostly medical retina, glaucoma, corneal and ocular surface in the SCI and Turkish journals [2, 3, 16]. With the increased importance of gaining citation points according to the new criteria for associate professorship, authors have tended towards areas where more articles have been published and where they will be able to be cited.

There can be seen to be a tendency towards SCI journals among the authors of articles on animal research. These studies, which have high scientific value, often show a multidisciplinary approach with the participation of pathology, histology-embryology, biochemistry and audiology departments. The inclusion of different departments increases the number of authors, and this increased number of authors directs the authors of articles to international journals because of the expectation of points in respect of the associate professorship criteria. There has been an intensification of animal studies in the field of ophthalmology in both national and international journals. Between 2014 and 2019, of the 654 articles published in SCI journals, 40 (6.1%) were experimental animal studies. However, of the 654 articles published in national ophthalmology journals, only 4 (0.33%) were experimental animal studies. The costs, ethical approval process and accessibility to animal laboratories have led to these types of studies being conducted more in universities. The support of research funds in state and private universities enables this scientific contribution in the field of ophthalmology.

In the science map that has been produced from articles published in the last 6 years in Turkey in the field of ophthalmology, a wider spread of authors in national journals can be seen. The South-East, East, and Black Sea regions can be seen to be lagging behind the other regions. There are no first authors from 13 regions in national journals. Improvement in education facilities and medical technical facilities in these provinces is important in respect of the spread of science and academic thinking across the whole country. The three cities of Istanbul, Ankara and Izmir comprise 30.68% of the population of Turkey, and due to the presence of universities, training and research hospitals and private universities in these cities, they account for 48.91% of the articles published in national journals and

55.52% in SCI journals. There is a need for education and health policies to target improvements in educational possibilities and medical facilities for the development of the provinces with few scientific articles published.

There were some limitations to this study. A 6-year period was examined, as 3 years before and 3 years after the change in associate professorship criteria. Examination of a longer period may provide clearer results in the field of ophthalmology. Evaluation was made in the study of 5 national and 16 SCI-screened journals in the field of ophthalmology. Journals of other branches, SCI-expanded journals and general medical journals were not included, and any articles in the field of ophthalmology in those journals were not evaluated.

Conclusion

The change in associate professorship criteria caused a decrease in the number of authors of articles in both national and SCI journals. Scientific studies require teamwork and as a result, different ideas and different points of view increase the quality of articles. Universities and training and research hospitals are at the forefront as the institutions contributing to science. Medical retina is the area attracting the most attention of authors. Researchers conducting experimental animal studies tend towards international journals rather than national journals as they consider experimental studies more valuable.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

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